

REMARKS

Applicants thank the Examiner for the withdrawal of the finality of the previous Office Action. Dependent claim 30 has been canceled herein and the limitations therein have been incorporated into independent claim 24. Claim 25 has been amended to correct an informal error. New claim 37 has been added. Support for new claim 37 can be found in the Specification as originally filed, for example, at p. 8, lines 2-10. Claims 1-6, 8-12, 14, 16, 18-22, 24-26, and 28-37 are now pending in this application. Reconsideration of the present application in light of the above amendments and the following remarks and an indication of allowance of the pending claims are respectfully requested.

Claims 1, 3, 5-6, 9-12, 14, 16, 18-21, and 34-35 are rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 4,270,896 to Polinski et al. (Polinski) in view of U.S. Patent No. 3,953,176 to Santala et al. (Santala), U.S. Patent No. 6,667,017 to Murrell et al. (Murrell), U.S. Patent No. 6,040,266 to Fay, III et al. (Fay III), and U.S. Patent No. 5,183,401 to Dalla Betta et al. (Dalla Betta). Claims 24-26, 29, 31, and 36 are rejected under 35 U.S.C. §103(a) as being unpatentable over Polinski in view of Fay, III, and Butler et al. (RMRS-RP-9). Claims 2, 8, and 22 are rejected under 35 U.S.C. §103(a) as being unpatentable over Polinski in view of Santala, Murrell, Fay, III, and Dalla Betta, and further in view of U.S. Patent No. 5,207,053 to Spadaccini et al. (Spadaccini). Claim 4 is rejected under 35 U.S.C. §103(a) as being unpatentable over Polinski in view of Santala, Murrell, Fay, III, and Dalla Betta as applied to claim 1 above, and further in view of U.S. Patent No. 5,645,803 to Steenackers et al. (Steenackers). Claim 28 is rejected under 35 U.S.C. §103(a) as being unpatentable over Polinski, Fay, III, and Butler et al. (RMRS-RP-9) as applied to Claim 24 above, and further in view of Steenackers. Claim 30 is rejected under 35 U.S.C. §103(a) as being unpatentable over Polinski, Fay, III, and Butler et al. as applied to claim 24 above, and further in view of U.S. Patent No. 5,228,847 to Lywood (Lywood). Claims 32-33 are rejected under 35 U.S.C. §103(a) as being unpatentable over Polinski, Santala, Murrell, Fay, III, and Dalla Betta as applied to claims 1 and 6 above, and further in view of Butler et al. (RMRS-RP-9).

Independent Claim 1

Independent claim 1 was rejected under 35 U.S.C. §103(a) as being unpatentable over Polinski in view of Santala, Murrell, Fay, III, and Dalla Betta. As is currently pending, independent claim 1 requires in part:

a first catalytic stage comprising a metallic catalyst support and receiving an oxidizer and a fuel and discharging a partially oxidized fuel/oxidizer mixture;

a second catalytic stage comprising a ceramic reticulated foam catalyst support disposed within a pressure boundary defining a pressure boundary cross-sectional flow area...

In the October 10, 2008 Office Action, the Examiner admits that "Polinski et al. does not teach a metallic catalyst support for the first catalytic stage and a ceramic reticulated foam catalyst support for the second catalytic stage..." See p. 4 of the October 10, 2008 Office Action. Nevertheless, the Examiner contends that Santala fills in the deficiencies of Polinski. Specifically, the Examiner states:

Santala et al. discloses a catalytic converter having two stages made of corrugated metal strips (see Abstract; column 1, line 32 through column 2, line 33; and figure 7) and in an alternate embodiment the catalyst section (12b) are formed with a hollow cylindrical configuration by wrapping the paired corrugated catalyst strip material (32) around a metal tubing (58) (see column 7, line 5 through column 8, line 3 and figure 9)...Therefore, because their two catalytic support materials were art-recognized equivalents at the time the invention was made, one of ordinary skill in the art would have found obvious to substitute metal for ceramic.

Applicants respectfully disagree with the Examiner's position. Santala fails to disclose "a metallic catalyst support" and "a ceramic reticulated foam catalyst support," or that these components are interchangeable. Specifically, Santala discloses two corrugated strips 28 (which are preferably metallic) that are paired together as shown by 32 in Fig. 3 to form a herring-bone like pattern. See col. 3, lines 59-62 and col. 4, lines 29-33 of Santala. According to col. 4, lines 33-36 of Santala, "[t]he paired strip materials 32 are then wrapped together in a jelly-roll configuration as shown in FIG. 5 to form a generally cylindrical catalyst section 12."

The alternate embodiment disclosed by Santala at col. 7, line 5 through col. 8 line 3, and figure 9 (and cited by the Examiner), does not disclose “a ceramic reticulated foam catalyst support” as claimed, but rather discloses an alternate embodiment, wherein the previously described paired metallic corrugated strips 32 are instead wrapped around a metal tube instead of wrapping about itself in a jelly roll configuration. Thus, Santala does not disclose “a ceramic reticulated foam catalyst support” as claimed. As a result, Santala further cannot teach or suggest that “a metallic catalyst support” and “a ceramic reticulated foam catalyst support” are interchangeable equivalents.

Moreover, Applicants submit that the Examiner’s five-way combination of references to reject independent claim 1 fails because it is readily apparent, based on the above description of Santala, that one skilled in the art would not have been prompted to modify the teachings of Polinski, Murrell, Fay, III, and/or Dalla Betta with the teachings of Santala to arrive at the claimed invention. As stated in *In re Kahn*, 441 F.3d 977, 988 (CA Fed. 2006, cited with approval in *KSR Int’l v. Teleflex Inc.*, 127 S.Ct. 1727, 1741 (2007), “there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” (Emphasis added). No such rational reasoning exists because Santala does not describe the alleged interchangeable materials as contended by the Examiner.

In view of the above, Applicants respectfully submit that independent claim 1 is in condition for allowance. Further, dependent claims 2-5, 32, and 34 are dependent on independent claim 1 and thus include the limitations of independent claim 1. For at least the reasons set forth above with respect to independent claim 1, Applicants respectfully submit dependent claims 2-5, 32, and 34 are also in condition for allowance.

#### Independent claim 6

Independent claim 6 was also rejected under 35 U.S.C. §103(a) as being unpatentable over Polinski in view of Santala, Murrell, Fay, III, and Dalla Betta. Applicants submit that independent claim 6 is patentable over the five-way combination of Polinski, Santala, Murrell, and Dalla Betta because the references, even if combined, fail to teach or suggest a “plurality of separate catalytic elements disposed along a flow

axis of the combustor, each of the plurality of separate catalytic elements comprising an identical cross-section and being misaligned and axially rotated about the flow axis with respect to an adjacent catalytic element effective to cause mixing of a flow about the flow axis..."

The Examiner admits that Polinski does not "disclose the second catalytic stage further comprises a plurality of separate catalytic elements disposed along a flow axis of the combustor, each of the plurality of separate catalytic elements comprising an identical cross-section and being misaligned and axially rotated about the flow axis with respect to an adjacent catalytic element effective to cause mixing of a flow about the flow axis." See pp. 6-7 of the October 10, 2008 Office Action. Nevertheless, the Examiner contends that Murrell et al. discloses the same at Figure 3c of Murrell. The Examiner concludes that "[i]t would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the combined teachings of Polinski and Santala with that of Murrell such that a metallic catalyst support for the first catalytic stage and a ceramic reticulated foam catalyst for the second catalytic stage in order to further increase the conversion of NO (see Murrell et al column 11, lines 44-50)." See p. 7 of the October 10, 2008 Office Action.

Applicants respectfully disagree with the Examiner's position. Fig. 3c, referenced by the Examiner, is explained in the Specification of Murrell at col. 11, lines 48-65. Specifically, Murrell at lines 44-48 discloses "[i]t is believed that to further increase the conversion of NO, a combination of corrugated porous MEC mesh material and conventional honeycomb monolith in a vertical flow orientation may be used. This is shown in FIG. 3c. Further, Murrell explains that "[i]n FIG. 3c, the corrugated structure 14 is combined with a monolith structure 16 of generally the same construction as structures 10 and 12 except the lengths are now shorter to provide a given conversion provided by either the monolith alone of FIG. 3a or the corrugated structure of FIG. 3b." (emphasis added). Thus, Murrell merely discloses the combination of two different materials, but do not disclose a "plurality of separate catalytic elements disposed along a flow axis of the combustor, each of the plurality of separate catalytic elements comprising an identical cross-section and being misaligned and axially rotated about the

flow axis with respect to an adjacent catalytic element effective to cause mixing of a flow about the flow axis..." as claimed.

Applicants further note that the different line hatchings for sections 14 and 16 (90° and 45° lines respectively) in Fig. 3c of Murrell are required markings used to indicate two different materials. See MPEP 608.02, which actually requires that "[t]he hatching of juxtaposed different elements must be angled in a different way." Nothing in Murrell, however, remotely teaches or suggests that the sections 14 and 16 are purposefully "misaligned and axially rotated about the flow axis with respect to an adjacent catalytic element effective to cause mixing of a flow about the flow axis..." as claimed. In view of the above, Applicants submit that independent claim 6 is in condition for allowance.

In addition, dependent claims 8-12, 14, 16, 18-22, 33, and 35 are dependent on independent claim 6 and thus include the limitations of independent claim 6. For at least the reasons set forth above with respect to independent claim 6, Applicants respectfully submit dependent claims 8-12, 14, 16, 18-22, 33, and 35 are also in condition for allowance.

#### Independent Claim 24

Applicants have amended independent claim 24 to include the limitations of now canceled dependent claim 30. Dependent claim 30 is rejected under 35 U.S.C. §103(a) as being unpatentable over Polinski in view of Fay, III, and Butler et al. as applied to claim 24, and further in view of Lywood.

In rejecting claim 30, the Examiner admits that Polinski does not explicitly disclose that the foam support is supported against the internal perimeter by spaced apart standoffs. Nevertheless, the Examiner states that Fay "appears to be supported in figure 8 [of Fay, III]." See p. 19 of the October 10, 2008 Office Action. Applicants disagree, and submit even if Fay inherently provides for standoffs (which it does not), nothing in Fay, III expressly or inherently discloses "spaced apart standoffs comprising the reticulated foam support." Moreover, the Examiner contends that Lywood discloses a "foam support being supported against the internal perimeter by spaced apart standoffs." See p. 19 of the October 10, 2008 Office Action. Applicants respectfully submit that even if Lywood discloses "foam support being supported against the internal

perimeter by spaced apart standoffs," Lywood fails to disclose "spaced apart standoffs comprising the reticulated foam support" as claimed as standoffs 39 are merely disclosed as being a liner. See Lywood at col. 9, lines 48-51 discloses that "bypass passages are formed by an external conduit formed by the annular space between a liner 39 and the exterior shell of the combustion apparatus." There is no disclosure that the liner 39 of Lywood comprises a reticulated foam support as is required in independent claim 24. Accordingly, Applicants respectfully submit independent claim 24 is now in condition for allowance as the combination of cited references fails to teach or suggest each element of independent claim 24.

In addition, dependent claims 25-26, 28-29, 31, and 36-37 are dependent on Claim 24 and thus include the limitations of independent Claim 24. For at least the reasons set forth with respect to independent claim 24, Applicants respectfully submit that dependent claims 25-26, 28-29, 31, and 36-37 are also in condition for allowance.


Applicants further submit that new dependent claim 37 provides further reasons for allowance. New claim 37 requires that the catalytic combustor further comprises a plurality of additional bypass passageways for allowing the second portion of the fuel/oxidizer mixture to bypass the foam support, wherein the plurality of additional bypass passageways comprises a plurality of spaced apart, tubular passageways extending longitudinally through the foam support.

Conclusion

Applicants respectfully request reconsideration and allowance of the present application in view of the foregoing arguments.

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Respectfully submitted,

  
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